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AUTHOR Buggley, L. JoAnne
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ABSTRACT

The study reported here builds on, and overcomes certain difficulties in, a previous study by Hunkins. The major focus of the research was to determine the relative effects on learning of two teaching techniques: one using 70% knowledge-level questions and 30% higher-level questions (Treatment A); the other using the reverse ratio (Treatment B). Secondary variables relating to sex, school location, and the interactions of treatment, sex, and school location were also examined. One hundred eight second-grade children were selected from a Standard Metropolitan Statistical Area, and were randomly assigned to the three groups (one control group--Treatment C). The three groups received six weeks of instruction from experienced elementary teachers. The content involved the concepts of rules and location. No texts were used; all materials were presented visually and the children responded orally to questions asked by the teacher. Findings were that: 1) children in Groups A and B performed significantly better on the achievement tests than Control Group children; 2) Group B achieved significantly better than Group A; 3) no significant effect was found relating to the sex variable; 4) suburban children did significantly better than urban children; and, 5) no interactions among the variables studied were found to be significant. Conclusions and implications based on these findings were discussed. (Author/JLB)

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A STUDY OF THE RELATIONSHIP OF CLASSROOM QUESTIONS
AND SOCIAL STUDIES ACHIEVEMENT OF SECOND-GRADE CHILDREN*

by
L. JoAnne Buggy
Program Director
Social Studies Service Center

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This is one of three studies investigating several related aspects of the problem of higher-level questions and their effects on the achievement of children in the elementary school. Although the three studies were conducted independently, they are closely related and the reader may wish to refer to these companion investigations. They are: "A Study of the Relationship of Classroom Questions and Social Studies Achievement of Fifth-Grade Children" by Tom Savage and "A Study of the Relationship of Two Methods of Question Presentation, Sex, and School Location to the Social Studies Achievement of Second-Grade Children" by June Tyler.

The Problem

The purpose of this study was to examine the relationship between classroom questions and the social studies achievement of second-grade children. During each school day, children are asked to respond to questions in many forms. They answer questions asked by their teachers, their peers, and in their instructional materials. The relationship of these questions to the attainment of educational objectives has never been defined clearly. The impact of questions on children needs to be understood. In order to more fully perceive the influence of questions on the achievement of learners, two teaching techniques were evaluated: one used seventy per cent knowledge-level questions and thirty per cent higher-level questions and the other used thirty per cent knowledge-level questions and seventy per cent higher-level questions.

Hunkins' (1966, 1968) examination of the effect of classroom questions on achievement and his suggestions for further research provided the major bases for this study. He stated that, "Teachers need to realize that certain kinds of questions are capable of influencing pupils in predictable ways (1968, p. 115)." His findings indicated that sixth-grade children exhibited a higher level of social studies achievement when taught with materials utilizing predominantly higher-level questions.

Hunkins' study of four weeks duration involved no classroom discussion. All pupils received text-type materials that they read independently and to which they responded in written form. He concluded that the ability to handle higher-level questions was related to the pupil's ability to read. He suggested further research that included class discussion, a lengthened time period, and a variation of content.

*This paper was presented at the 1972 AERA convention, Chicago, Illinois. It is a preliminary draft and is not to be quoted from without the author's express permission.

The present study was designed to overcome the difficulties identified by Hunkins. It did not involve the pupils in any reading or independent study. The children responded orally to all questions as asked by the teacher. No textbooks were used; all materials were presented visually. The time period was extended to six weeks. The content involved the concepts of rules and location, neither of which was included in Hunkins' study.

As a result of his findings, Hunkins suggested using a different sample. He conducted his study with sixth graders in a large suburban school system. The present study was conducted with second-grade children in similar urban and suburban school systems based on five criteria selected from the latest Census Tracts data available.

Hunkins' criterion instrument was devised by the researcher. It consisted of forty-two multiple-choice items including all levels of Bloom's (1956) Taxonomy. This study also used a criterion instrument constructed by the researcher that included multiple-choice items based on all categories of the Taxonomy. The number of items on the test was increased to sixty.

In Hunkins' initial examination of the data, he found no significant difference in achievement based on sex. Further analysis of the data indicated possible treatment and sex interactions. The current investigation, therefore, examined the variable of sex and its possible interactions.

The experimenter in this study determined that the variables of (1) level of questions, (2) sex of the children, and (3) school location of the children would be significant in relationship to social studies achievement. Hunkins examined the variables of treatment, sex, and reading level; thus, the current study holds two of the variables of Hunkins' work constant and varies the third.

An examination of the questions found in teachers' guides for second-grade social studies by Tyler and Buggey (1970) revealed approximately seventy per cent knowledge-level questions being suggested for use by teachers in 1965, and thirty per cent knowledge-level questions being suggested in current editions. Their survey as well as classroom observations provided the proportional balance of questions adopted for the present study. This distribution varies from Hunkins' experiment in which one group received text-type materials constructed by the researcher using approximately forty-eight per cent analysis and evaluation questions, and the second group received text-type materials with ninety per cent knowledge-level questions. All teaching materials in the current study were constructed by the experimenter.

Finally, in addition to the findings of Hunkins dealing with the influence of reading as a variable, the work of Piaget has influenced the visual method of instruction employed. His classification of children's stages of intellectual development indicates that many second-grade children are entering the concrete operations stage (e.g. Sullivan, 1967; Ginsburg and Oppen, 1969; Helmore, 1969). Therefore, all materials in the present study were in visual form.

In order to examine the problem in this study, the following major hypothesis was tested:

There will be significant differences in achievement between the groups as a result of treatment conditions.

a. The group of second-grade children receiving presentation of social studies materials using seventy per cent knowledge-level questions and thirty per cent higher-level questions will achieve significantly better than a comparable group receiving presentation of social studies materials using a placebo treatment.

b. The group of second-grade children receiving presentation of social studies materials using thirty per cent knowledge-level questions and seventy per cent higher-level questions will achieve significantly better than a comparable group receiving presentation of social studies materials using a placebo treatment.

c. The group of second-grade children receiving presentation of social studies materials using thirty per cent knowledge-level questions and seventy per cent higher-level questions will achieve significantly better than a comparable group receiving presentation of social studies materials using seventy per cent knowledge-level questions and thirty per cent higher-level questions.

Six secondary hypotheses also were examined relating to sex, school location, and the interactions of treatment, sex, and school location.

Experimental Procedures

A Posttest Only, Control Group procedure using a 3x2x2 (Treatment by Sex by School Location) factorial design was utilized in this experiment (Table I). The data gathered were examined by analysis of variance statistical techniques. The .05 level of significance was selected to test the null hypotheses. The Newman-Keuls Test was used to determine within main effects differences.

One hundred eight second-grade children were selected in order to study the relationships stated in the hypotheses. They were chosen from a Standard Metropolitan Statistical Area of about one million population where approximately one-half of that population lives within the legal limits of the largest city. Two schools were selected, one within the legal limits of the largest city and the other within the SMSA but not within the legal limits. The population from which each school was chosen was below the median for the SMSA on the following five criteria as defined in the latest available Census Tracts data: (1) family income, (2) number of years of education completed per adult, (3) per cent of white collar workers, (4) number of persons per dwelling, and (5) value per dwelling unit (Table II).

The children from each second-grade sample were assigned randomly to three groups; each group was assigned randomly to Treatment A, Treatment B, or the Control Group. The three groups received six weeks of instruction from experienced elementary teachers.

Treatment A responded to a series of questions asked by the teacher containing seventy per cent knowledge-level questions and thirty per cent higher-level questions. Treatment B responded to a series of questions asked by the teacher containing thirty per cent knowledge-level questions and seventy per cent higher-level questions. During the first three weeks of instruction, teachers in Treatment A and Treatment B followed eight lesson scripts containing questions relating to a series of visual materials presenting the concept rules. During the second three weeks, the teachers followed eight lesson scripts containing questions relating to a series of visual materials presenting the concept location. The Control Group received no instruction related to either concept, rules or location.

The criterion instrument was created by the experimenters for use in the study. It consisted of two subtests, each containing thirty multiple-choice questions including five questions at each of the six levels of the Taxonomy. All questions on the instrument were categorized as knowledge-level or higher-level by three college professors familiar with the Taxonomy. Interobserver reliability was found to be .92. Test reliability was found to be .84 using the Kuder-Richardson Formula 20. At the end of the first three weeks of instruction, all pupils completed the subtest related to the concept rules. At the end of the second three weeks of instruction, all pupils completed the subtest related to the concept location. Each pupil's achievement was measured by the total of the scores on the two parts of the test.

Findings

An analysis of variance was performed on the data gathered in this experiment. The raw score for each subject can be found in Table III. Three main effects and four interactions were examined relating to the seven hypotheses of the study. The summary of the analysis of variance is found in Table IV. Since a significant treatment main effect was obtained, a Newman-Keuls Tests was performed to determine where the significant differences were. The results of the Newman-Keuls Test are reported in Table V.

The Newman-Keuls Test indicated that children in Treatment Group A and Treatment Group B performed significantly better on the achievement tests than children in the Control Group. Treatment Group B achieved significantly better than Treatment Group A. No significant effect was found relating to the sex variable. The children in the suburban school location did significantly better on the achievement test than did the urban children. No interactions among the variables studied were found to be significant.

Conclusions

Four conclusions seem to follow from the findings of this segment of the larger study.

1. The use of thirty per cent knowledge-level questions and seventy per cent higher-level questions with second-grade children

resulted in significantly greater social studies achievement than the use of seventy per cent knowledge-level questions and thirty per cent higher-level questions. This conclusion supported the major hypothesis of the study. It also supports the findings of Hunkins (1966, 1968). The most probable explanation is that children who had more opportunity to use questions emphasizing higher-level questions during the instructional period were able to answer questions significantly better than a group emphasizing knowledge-level questions when given an achievement test using questions at all levels of the Taxonomy. It is also possible that instruction incorporating all levels of the Taxonomy and not relying on reading as a means of learning influenced the performance of the children.

2. Sex did not significantly influence the social studies achievement of second-grade children. The lack of difference may have been the result of the particular content. The concepts, rules and location, seem to have equal appeal for boys and girls in the second grade. It may also have been a result of the use of visual materials. The discussion orientation of the presentation and the format of the criterion instrument did not require the children to do any reading. All boys and girls had the same opportunities to respond to situations that were relevant to them. This conclusion adds support to the findings of Hunkins (1966, 1968) that sex differences and achievement did not seem to be related.

3. Second-grade children in a suburban school location did significantly better than second-grade children in an urban school location when socio-economic level was held constant. The reasons for this difference are unclear, although several possibilities must be considered. The materials used could have influenced the pupils' achievement in that they may have had more appeal for the learners in the suburban school. The particular situations used to motivate the discussions of the concepts, rules and location, may have presented the kind of problems to which they could relate with greater ease.

The regular curriculum of the suburban school may have allowed for greater familiarity with classroom discussions of the type used in the present study, even though the kind of questions asked in the classrooms were comparable. The additional opportunity to participate in class discussion may account in part for the higher scores obtained by the suburban children. Further investigation of this variable is needed.

4. There were no significant interactions among the variables studied as a result of this particular segment of the investigation. Treatment, sex, and school location seem to have functioned independently. This is contrary to one of Hunkins' findings. He suggested that there was a possible interaction between sex and treatment. The literature is still unclear on this relationship.

Implications

The findings in the study provide support for Bloom's Taxonomy as a satisfactory means of organizing instruction and testing pupil outcomes. For those involved in the education of primary teachers, especially those interested in second grade, it seems to be important to provide further instruction in the use of the questioning strategy to better prepare teachers to ask questions that encourage higher-level thinking. If children do achieve significantly better on a test incorporating all levels of the Taxonomy when instructed using thirty per cent knowledge-level questions and seventy per cent higher-level questions then teachers need to be instructed in the use of higher-level questions in the classroom. Although teachers have been aware of the importance of the question for many years, the literature does not indicate that teachers are asking questions to encourage higher-level thinking. Teachers need to be provided with appropriate kinds of experiences that will allow them to practice formulating the kind of questions that should be considered in relationship to the objectives of instruction stated by the teacher and also in construction of materials for use in the classroom. Specific courses are needed to provide these experiences.

Inservice education programs are continuously being conducted in school systems throughout the country. The study seems to reinforce the importance of asking higher-level questions in order to improve the social studies achievement of second-grade children. Awareness is not enough. Inservice education programs need to provide primary teachers with opportunities for further examination of the questioning strategy in order to clarify the use of higher-level questions.

Curriculum specialists also need to give particular attention to identifying objectives for use in the primary grades that require higher-level thinking. Social studies curriculum guides should include generalizations that require the use of higher-level questions by the teacher in order to fully develop pupil understanding of the generalizations. In this way, curriculum guides will provide direction for the teacher in forming appropriate questions.

Curriculum specialists also need to carefully describe the prerequisite skills involved in working with particular materials. Guidelines need to be provided for the teacher in order to allow for classroom objectives to be constructed based on the learners' needs.

In the present study the findings seem to emphasize the need of publishers to continue to increase the use of higher-level questions in materials prepared for use by primary teachers. The trend seems to be in the right direction. New materials should provide models of appropriate questioning sequences as guidelines for teachers to use in the classroom. Specific questions emphasizing higher-level thinking should be provided for use with learners. Evaluation instruments should also be provided for the teacher. These should include questions from all levels of the Taxonomy and should not involve the learners in reading.

In addition, the use of visual materials seems to be reinforced. Achievement of primary-grade children was stimulated by the use of visual materials in class discussions. The importance of pictures in the development of text-type materials needs further consideration. The presentation of pictures with a series of predominantly higher-level questions provided for the teacher's guidance should continue to be incorporated in those materials now being planned. This type of presentation, whether in textbooks or in special learning packets, allows the teacher to adapt the lesson to the specific needs of the learner.

Several research needs seem to be apparent as a result of this investigation. Further analyses of the data gathered in the present study regarding the influence of each level of Bloom's Taxonomy on second-grade social studies achievement is needed in order to determine if second-grade children are able to answer questions equally well at all levels of the Taxonomy. It may be, for example, that a specific type of question is more difficult for second-graders to answer. Additional comparison of the three segments of the study is needed.

The use of classroom questions also needs further clarification. A similar proportion of questions could be examined using other social studies content and other school subjects. Combinations of questions other than the thirty per cent knowledge-level and seventy per cent higher-level questions found in this study to be most effective also could be examined. Varying the content or proportion of knowledge and higher-level questions would provide further insights concerning a possible optimal proportion of questions for use in particular subject matter areas.

The time period of six weeks selected for this investigation appears to have been ample to allow for evidence of a treatment effect. Achievement over a longer period of time, however, should also be examined.

The influence of the sex of the learner as a significant variable influencing the social studies achievement of second-grade learners needs further investigation as the literature remains unclear. It is possible that no significant difference was found relating to the content presenting the concepts, rules and location, but that significant differences might appear when other concepts are studied.

Finally, a further investigation of the effects of urban and suburban school location needs to be made. No literature was available at the time of this study that related the influence of school location to achievement in the primary grades when the socio-economic level of the pupils is held constant. Several factors seem to need further examination. The same classification of urban and suburban school location could be used and examined in a different SMSA. Different socio-economic levels could be examined using the same criteria established for the present study. Finally, the ethnic groups in each area could be examined as a variable.

The question is a widely used teaching strategy, and its uses must be clarified. These are some of the implications based on the findings of this study that seem to provide further direction for educators, curriculum specialists, publishers, and researchers.

BIBLIOGRAPHY

- Bloom, Benjamin S. (ed.). Taxonomy of Educational Objectives, Handbook I: Cognitive Domain. New York: David McKay Company, Inc., 1956.
- Buggey, L. JoAnne. A Study of the Relationship of Classroom Questions and Social Studies Achievement of Second-Grade Children. (Doctoral dissertation) Ann Arbor, Michigan: University Microfilms, 1971.
- Ginsburg, Herbert, and Sylvia Oppen. Piaget's Theory of Intellectual Development: An Introduction. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.
- Helmore, G. A. Piaget--A Practical Consideration. Oxford: Pergamon Press, 1969.
- Hunkins, Francis P. The Influence of Analysis and Evaluation Questions on Achievement and Critical Thinking in Sixth Grade Social Studies. United States Department of Health, Education and Welfare Project No. 7-1-005. Washington, D. C.: Government Printing Office, 1968.
- _____. The Influence of Analysis and Evaluation Questions on Critical Thinking and Achievement in Sixth Grade Social Studies. (Doctoral dissertation) Ann Arbor, Michigan: University Microfilms, 1966.
- Sullivan, Edmund V. Piaget and the School Curriculum--A Critical Appraisal. Bulletin No. 2. Toronto: The Ontario Institute for Studies in Education, 1967.
- Tyler, June, and JoAnne Buggey. "Textbook Questions: New and Used." Unpublished study, The University of Washington, Seattle, 1970.
- Tyler, June F. A Study of the Relationship of Two Methods of Question Presentation, Sex, and School Location to the Social Studies Achievement of Second-Grade Children. (Doctoral dissertation) Ann Arbor, Michigan: University Microfilms, 1971.
- United States Bureau of the Census. Eighteenth Census of the United States: 1960. United States Censuses of Population and Housing, Census Tracts, Seattle. Washington, D. C.: Government Printing Office, 1961.

APPENDIX

TABLE I
SUMMARY OF DESIGN*

	Sex			
	Male B ₁		Female B ₂	
	School Location		School Location	
	Urban C ₁	Suburban C ₂	Urban C ₁	Suburban C ₂
Treatment Group A A ₁	A ₁ B ₁ C ₁	A ₁ B ₁ C ₂	A ₁ B ₂ C ₁	A ₁ B ₂ C ₂
Treatment Group B A ₂	A ₂ B ₁ C ₁	A ₂ B ₁ C ₂	A ₂ B ₂ C ₁	A ₂ B ₂ C ₂
Control Group A ₃	A ₃ B ₁ C ₁	A ₃ B ₁ C ₂	A ₃ B ₂ C ₁	A ₃ B ₂ C ₂

*n = 9 per cell and 108 for total sample.

TABLE II
SOCIO-ECONOMIC CHARACTERISTICS
DESCRIPTIVE OF POPULATION*

Characteristics	SMSA	Urban	Suburban
Median Income	\$ 6,896	\$ 5,956	\$ 6,632
Median School Years Completed per Adult	12.2	11.1	11.4
Median Population per Household	3.02	2.86	2.9
Median Value per Unit	\$13,600	\$10,844	\$12,300
Per Cent White Collar Workers	.52	.41	.46

*Figures taken from the 1960 Census Tracts data.

TABLE III
OUTCOMES OF A $3 \times 2 \times 2$ FACTORIAL EXPERIMENT
WITH A RANDOMIZED GROUP DESIGN

A ₁				A ₂				A ₃			
B ₁		B ₂		B ₁		B ₂		B ₁		B ₂	
C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂
44	31	27	33	31	46	41	43	14	13	19	11
27	33	28	31	34	45	46	50	21	15	18	13
27	36	29	31	37	47	35	35	15	9	19	15
18	46	33	34	40	42	42	41	22	14	17	25
35	32	33	27	43	42	36	45	14	18	14	9
28	31	25	25	41	49	41	46	13	17	13	16
23	41	26	33	44	43	48	43	13	22	17	24
35	40	40	38	39	50	35	37	20	15	14	17
23	36	30	30	43	46	38	50	5	14	17	20
Σ 260	326	271	282	352	410	362	390	137	137	148	150

TABLE IV
ANALYSIS OF VARIANCE

	Source of Variation	Sum of Squares	d.f.	Mean Square	F
A:	Treatment	12495.16	2	6247.58	269.99**
B:	Sex	3.34	1	3.34	
C:	School Location	252.09	1	252.09	10.89**
A × B:	Treatment × Sex	45.71	2	22.86	
A × C:	Treatment × School Location	118.18	2	59.09	2.55
B × C:	Sex × School Location	63.78	1	63.78	2.76
A × B × C:	Treatment × Sex × School Location	45.31	2	22.66	
Error:	Within treatments	2221.35	96	23.14	
	Total	15244.92	107		

*p < .05.

**p < .01.

TABLE V
NEWMAN-KEULS TEST

	X ₃	X ₁	X ₂
X ₃ = 15.89	-----	15.75*	26.17*
X ₁ = 31.64		-----	10.42*
X ₂ = 42.06			-----

*p < .01